SkyBridge, filtering will be used.[191] Boeing explained in its comments that it will consult with radio astronomy users.[192] Therefore, SkyBridge cannot agree at this juncture that the Commission should adopt a stringent filtering requirement, as NAS has proposed.[193] No such requirement is imposed on any other service in the band. Moreover, the same requirement may not be appropriate for all NGSO systems. Protection mechanisms should be up the system operator. This approach is consistent with the Commission's regulation of other satellite services.[194]

3. RF Hazard

SkyBridge agrees with the Commission and some of the commenters that safety concerns are of the utmost importance. As SkyBridge explained in its comments, the procedures to ensure that the Commission's safety standards are met are already in place (see Section 1.1307(b)).

Although SkyBridge agrees that NGSO operators should be subject to the same environmental and RF safety guidelines as all other Commission licensees,[195] NGSO operators should have the same flexibility as other operators to determine how they meet these requirements. Therefore, SkyBridge cannot agree to

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191/ See SkyBridge Comments at 101-102.

192/ Boeing Comments at 86.

193/ NAS Comments at 1.

194/ See, e.g., Section 25.142, requiring applicants for non-voice, non-geostationary MSS systems to "identify the measures they would employ to protect the radio astronomy service."

195/ GE Comments at 31.

the specific proposals of the some of the commenters, such as larger safe zones,[196] required fencing,[197] or minimum height requirements. [198]

No party even tried to demonstrate that any proposed NGSO terminal will exceed already prescribed limits, or that NGSO licensees will be unable to come into compliance with the Commissions safety regulations. Therefore, it is entirely unclear why some commenters proposed specific rules for NGSO earth stations (other than to further hinder NGSO entry). As with any other service, operators should be able to determine their own way to meet limits. As part of the licensing process, the Commission will ultimately have to be entirely satisfied by each licensee's proposed method. Therefore, there is no need to adopt a priori any of the arbitrary rules proposed by certain commenters.

196/ GE Comments at 31.

197/ Telesat Comments at 8.

198/ Id.

VIII. NGSO FSS LICENSING RULES

The Commission should impose service requirements on systems to ensure that each system furthers the fundamental international and domestic objective of universal access to competing broadband NGSO FSS systems that offer high-speed interactive services on a global basis. These requirements should be enforced vigorously to ensure that all NGSO licensees are ready, willing, and able to participate fully in developing the sharing arrangements that will be necessary to permit multiple entry.

A. Mitigating Interference to other NGSO FSS Systems

As discussed in Section VI.A above, the capability to employ satellite diversity to mitigate interference to other NGSO systems must be viewed as an essential qualification to be met by all Ku-band NGSO FSS applicants.

B. Ensuring Service Goals

Moreover, as discussed in the SkyBridge Comments, applicants should be required to demonstrate that their proposed system will: (1) provide global coverage; (2) offer a full range of high-speed broadband services; (3) provide full two-way interactive capability; and (4) offer direct access to the system for residential and business customers via low-cost ground terminals.

1. Coverage Requirements

In particular, SkyBridge supports the Commission's proposed coverage requirement, which is the same requirement it has imposed on other NGSO

systems.[199] The primary reason WRC-97 decided to facilitate NGSO FSS entry into the Ku-band was to ensure development of truly global services.[200] The proposed coverage requirement will also ensure provision of service to all corners of the United States, consistent with the mandate of Section 706 of the '96 Act.

Boeing also supports the Commission's proposal, but would go one step further. Boeing advocates that NGSO licensees should be required to provide "comparable" levels of service in all regions. For example, Boeing argues, operators should not be permitted to serve some regions with only a fraction of the capacity of other regions, to avoid encumbering global spectrum with systems that focus services on the Northern Hemisphere.[201] However, given that even truly global systems are designed with variations in the capacity targeted to various regions, based on projections of demand, it is not clear how this objective could be fairly implemented in practice. Moreover, once the NGSO system is in operation, the capacity provided in various regions will be determined by demand. SkyBridge believes that the global coverage requirements the Commission has applied to other NGSO systems have been, and will continue to be, sufficient to ensure global service.

Several parties urge the Commission not to impose a coverage requirement. Of course, these are precisely the parties that are not planning global

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199/ Loral also supports such consistency. Loral Comments at 19.

200/ Resolution 130 (WRC-97, Geneva) considerings a), b), e), and j).

201/ Boeing Comments at 73-74.

services.[202] These parties propose that market forces determine coverage.[203] However, this is exactly the outcome that WRC-97 was trying to avoid. The Commission should not permit these parties to thwart the manifestly clear objective of WRC-97.

2. Other Service Requirements

In addition to coverage requirements, the Commission should introduce related requirements to ensure that all systems provide the types of services contemplated by WRC-97 in making the NGSO FSS allocation in the Ku-band. Promotion of precisely such services has also been mandated by Congress in Section 706 of the '96 Telecom Act.

Specifically, SkyBridge urges the Commission to require all NGSO FSS licensees in the Ku-band to offer a full range of high-speed services. All systems should provide the consumer market and business customer two-way communications with full interactive capability. Finally, all systems should be designed to provide the consumer market[204] and business customers direct access to the offered services via low-cost ground terminals.

202/ See Denali Comments at 5; Tonga Comments at 4. Tonga proposes that any coverage requirements not apply to QGSO systems. This would be patently unfair to other systems, which must serve all regions, and not "cream-skim" the lucrative markets. The Commission should reject Tonga's proposal.

203/ Denali Comments at 5.

204/ See Section 709 Report at ¶ 28 (defining the "consumer market" as consisting of small business and residential customers).

C. Ensuring Financial and Technical Capabilities

SkyBridge urges the Commission to adopt the financial qualifications standards and various technical standards proposed in the NPRM, which have been used for other NGSO processing rounds,[205] and apply them in the strictest fashion.[206] Boeing strongly agrees, pointing out the serious impact on other licensees participating in the coordination of NGSO systems if some licensees are simply not prepared to move forward expeditiously.[207]

SkyBridge concedes that financial qualifications are not a perfect indicator of the seriousness and ability of a system proponent to proceed. However, it will be impossible to move forward with the NGSO FSS Ku-band processing round unless all parties are ready, willing and able to proceed. The Commission must make undertake a serious effort to identify those applicants who are not so prepared at this time, and SkyBridge can think of no better predictor of ability to move forward than the Commission's financial qualifications. While SkyBridge has no doubt that not all of the applicants that could meet the standard will actually build systems, SkyBridge

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205/ Moreover, the Ku-band NGSO FSS proceeding is clearly distinguishable from the 2 GHz Mobile-Satellite Service rulemaking in which the Commission proposed not to adopt financial qualifications because all of the proposed systems could be accommodated in the available spectrum. See The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, Notice of Proposed Rulemaking, IB Docket No. 99-81, RM-9328, rel. March 25, 1999. In this case, all studies suggest that mutual exclusivity exists, to a degree that cannot be eliminated by mere coordination.

206/ SkyBridge agrees with Boeing that, in applying the standard, the Commission should consider the pre-existing obligations of the various applicants (e.g., licenses for unbuilt systems). Boeing Comments at 67.

207/ Boeing Comments at 6, 61, 65-67.

is equally convinced that underfunded applicants will be the most likely to abandon the effort.

SkyBridge does not agree with Virgo that implementation milestones are sufficient in this case.[208] While SkyBridge does support adoption and vigorous enforcement of tight milestone requirements,[209] the Commission needs a tool it can apply immediately to separate out applicants that are more likely than others to hold up the processing round.[210] Milestone requirements will simply not serve to eliminate such applicants in the near future. The sharing coordinations must start immediately, and should involve only those applicants who can credibly demonstrate the wherewithal to fulfill the proposals on an expeditious basis. Eliminating an applicant a few years after licensing when it has failed to achieve a milestone would simply be too late in this instance.

SkyBridge agrees with Boeing that the Commission should strictly enforce its threshold application filing requirements. As explained by Boeing, adherence to these requirements provides a clear indication of whether an applicant has the technical expertise necessary and is willing to invest the resources necessary

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208/ Virgo Comments at iv, 23. It is interesting that Virgo proposes relying solely on milestone requirements to eliminate applicants that do not proceed to build out in a timely fashion, but explicitly opposes reporting requirements that would apprise the Commission of an applicant's progress prior to the milestone date. Virgo Comments at 25. Virgo appears to have simply chosen, among all the Commission's proposals, to support the qualification standard that would allow it to delay progress by the greatest amount without incurring any penalty. The Commission must not allow any applicant that option.

209/ SkyBridge Comments at 106.

210/ As Boeing argues, milestones are needed, but they should not be used as a substitute for equally strict enforcement of threshold qualification rules. Boeing Comments at 68.

to actually build-out its proposed system. As noted by Boeing, some applicants have failed to comply with the Commission's requirement that applicants demonstrate how their systems can share with incumbent users, indicating a level of system design that is insufficient to permit meaningful participation in a coordination proceeding.[211/]

D. U.S. Processing Round

1. First Round

Studies to date indicate that significant constraints and capacity penalties are imposed on NGSO system in order to accommodate even a small number (e.g., three) of NGSO FSS systems. The U.S. processing round must be conducted in such a way that this reality does not stall the licensing process, delaying commencement of the important services to be provided by the Ku-band NGSO FSS systems.

To prevent this, the Commission should apply the basic qualifications identified above. If, after application of such rules, the Commission has before it more qualified applicants than can be accommodated, the Commission should allow the applicants to attempt to negotiate a solution that enables all qualified parties to be licensed. As described by Hughes, the Commission should encourage the development of an industry working group among the NGSO FSS applicants, which would attempt to develop appropriate sharing approaches and parameters to permit multiple NGSO FSS entry.[212/]

211/ Boeing Comments at 6, 69-73.

212/ Hughes Comments at 4. SkyBridge agrees with Hughes that the Commission should provide the applicants with comfort that they will have wide latitude to propose system modifications that will facilitate a successful solution to

(continued...)

As discussed above, negotiations will not succeed unless all parties are serious and are at an advanced stage in their system design. As described by Boeing, each licensee will have to rely closely on the representations and assurances made by its spectrum-sharing partners. A licensee should not be expected to coordinate to protect one licensee, only to learn that the licensee was unable to build its system as planned and the sharing scheme needs to be revisited.[213/] The Commission must ensure that any negotiations are governed by ground rules that prevent parties from stalling the process for anticompetitive or other reasons.[214/]

For these reasons, the Commission must proceed as expeditiously as practicable to establish the necessary regulatory framework and license qualified applicants. As SkyBridge outlined in its comments, while it may be advisable to await the outcome of WRC-2000 to finalize certain of the technical rules here under consideration,[215/] the Commission should not impede progress on other matters.

212/ (...continued)
NGSO/NGSO sharing. Hughes Comments at 4. At the same time, however, no party should be forced to alter its system design involuntarily, unless this is necessary to come into compliance with Commission rules.

213/ Boeing Comments at 5, 60-62.

214/ There is substantial evidence that not all applicants presently before the Commission have the seriousness of intent to move forward expeditiously. It is telling that Hughes, an applicant for two NGSO systems, filed only five pages of comments in this proceeding, half of which was devoted to supporting the GSO interests of its sister companies, PanAmSat and DirecTV. Teledesic filed only eight pages, most of which was devoted to urging that subsequent applicants must protect first round applicants. It is simply not conceivable that a serious proponent of system that has reached mature design would be completely disinterested in the numerous proposals for technical and other rules on the table, which will ultimately govern such system.

215/ See also Loral Comments at 3; Qualcomm Comments at 2-3; HBO Comments (continued...)

In its comments, SkyBridge urged the Commission to issue a Public Notice regarding the acceptability for filing of the pending Ku-band NGSO FSS applications, conditioned upon whatever qualification, service and technical rules ultimately may be adopted. On March 23, the Commission took this step, and SkyBridge commends the Commission for acting to move the process forward. Other actions are necessary, however. As soon as possible, and in parallel, the Commission should:

- Formulate the NGSO FSS licensee qualification and NGSO/NGSO sharing rules, with a goal of adopting those rules in a First Report and Order to be issued no later than the end of the second quarter of 1999.
- Direct all Ku-band NGSO FSS applicants to initiate technical discussions to: (1) determine the extent of mutual exclusivity; and (2) devise a technical solution that would allow all qualified applicants to proceed.
- Begin international coordination of these systems in accordance with Article S9.12 of the Radio Regulations.[216/]

Moreover, the Commission should seek to issue licenses to these applicants by the close of 1999, although obviously licensees would need ultimately to comply with whatever final technical and service rules were adopted.[217/]

215/ (...continued)
at 2, 5.

216/ See STA Comments at 2.

217/ See also STA Comments at 2. Some parties urge the Commission not to allocate spectrum for NGSO systems (see EchoStar Comments at 6), or to license any NGSO system (see DirecTV Comments at 20; PanAmSat Comments at 14), until the EPFD limits applicable to such systems are established. However, these proposals do not address any valid concern; no NGSO FSS system will be able to operate until limits are actually adopted. The Commission should not unnecessarily constrain progress toward meeting the Section 706 goals.

Finally, as soon after the conclusion of WRC-2000 as is practicable, the Commission should conclude this proceeding by adopting a Second Report and Order establishing the necessary technical regulations for NGSO FSS operating at Ku-band.

2. Later Rounds

As discussed in the SkyBridge Comments, later entrants should not be permitted if the initial entrants have not even been able to employ the full resources afforded by the single entry limits. If a later round becomes possible, earlier systems (e.g., first round systems) should not be forced to alter their existing design or operations to accommodate later systems. Commenters in this proceeding agree that such changes would be in most cases infeasible, and in all cases inequitable.[218/]

218/ Teledesic Comments at 2-6; Boeing Comments at 63; Loral Comments at 15.

IX. NORTHPOINT

The commenters in this proceeding are virtually unanimous in urging the Commission to deny Northpoint's request to permit operation of terrestrial transmitters in the 12.2-12.7 GHz band on a secondary basis to transmit video and data traffic related to the operation of DBS systems.[219/] Although Northpoint originally justified its service as a supplement to DBS service, to be provided in affiliation with DBS licensees, no DBS licensee supports the Northpoint proposal. As the Satellite Broadcasting and Communications Association ("SBCA") stated, its members have every incentive to support any effort to provide local broadcast signals, but, in fact, they are uniformly opposed to Northpoint, because of the well-documented threat of interference.[220/] No party to this proceeding, except of course Northpoint, expressed any hope that Northpoint's system could, in any manner of operation, avoid causing grievous interference to DBS and NGSO FSS licensees in the band.[221/] And Northpoint provided no evidence in its comments to prove them wrong.

219/ Petition for Rulemaking to Modify Section 101.147(p) of the Commission's Rules to Authorize Subsidiary Terrestrial Use of the 12.2-12.7 GHz Band by Digital Broadcast Satellite Licensees and Their Affiliates, RM-9245, March 6, 1998 ("Northpoint Petition"), Attachment A; see also Public Notice, Report No. 2265, March 23, 1998. In addition, Northpoint affiliates filed, on January 8, 1999, 69 applications to provide Northpoint services in 212 markets (the "Northpoint Applications"). See Public Notice, DA 99-494, rel. March 11, 1999.

220/ SBCA Comments at 2-3.

221/ DirecTV Comments at 4,24; USSB Comments at 3; EchoStar Comments at 8; HBO Comments at 2,6; Boeing Comments at 86-89; Virgo Comments at 26; Denali Comments at 13; STA Comments at 10. Even GE Americom, which does not use the subject bands, expressed concerns about Northpoint's proposal, stating that it would be adversely affected if Northpoint were to propose operation in FSS spectrum. GE Comments at 2, 21. The only two

(continued...)

A. Northpoint's Proposed Service

1. Northpoint's Promises to Supplement DBS Service with Local Channels are Illusory.

Northpoint continues to insist that its technology "provides an inexpensive and readily available solution to the local signal problem of DBS providers."[222] Nothing could be further from the truth.

In the face of universal opposition from it purported beneficiaries -- the DBS licensees -- Northpoint has abandoned its proposal, clearly stated in its Petition, that service be provided through DBS licensees and their affiliates.[223] Instead, Northpoint has created a series of applications filed by its affiliates that have no identifiable relationship with any DBS licensee.[224]

The record clearly indicates that Northpoint has recast its service to enter the terrestrial wireless broadband access market and compete head-on with DBS licensees in the multichannel video programming distribution ("MVPD") market.[225] At this point, Northpoint's continued promise of a local channel supplement to DBS

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221 (...continued)
parties that supported in any way Northpoint's service goals, NAB and ALTV, explicitly declined to address the interference issue. NAB Comments at 2; ALTV Comments at 2.

222 Northpoint Comments at i.

223 Northpoint Petition, Attachment A.

224 It is worth noting that, under the rules proposed in the Northpoint Petition, it is not clear whether the Northpoint applications would even be eligible for licensing, given their lack of affiliation with a DBS licensee.

225 As DirecTV noted, "[w]hile Northpoint initially positioned its proposed service for political reasons as one that would be complementary to DBS, allegedly providing DBS subscribers with a source for local broadcast signals, Northpoint now pitches its concept as a full-blown competitive MVPD service." DirecTV Comments at 4, 29; see also EchoStar Comments at 14.

service is nothing but a transparent sham, offered in the hopes of circumventing the Commission's requirements (most notably, to avoid an auction) for access to the several bands of spectrum already allocated for terrestrial broadband and MVPD services.[226/]

2. Northpoint's Service is Not Novel, and Can be Provided in Other Bands.

Even if Northpoint does provide local channels in conjunction with its MVPD/broadband data services, such services already are authorized under a variety of different spectrum allocations. Northpoint's newest proposal is nothing more (and, as a one-way service, is substantially less) than Local Multipoint Distribution Service ("LMDS"), Multichannel Multipoint Distribution Service ("MMDS"), or Digital Electronic Message Service ("DEMS") by another name. The Commission has already allocated sufficient spectrum for these services in, inter alia, the 2.5 GHz, 24 GHz, 28 GHz and 38 GHz bands.[227/]

Indeed the Commission just commenced the latest auction for 28 GHz LMDS spectrum on March 23, 1999, for just the kinds of uses Northpoint is proposing.[228/] The Commission should not allow Northpoint and its affiliates to

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226/ As pointed out by Boeing, for retransmission of local signals, Northpoint would really require only about 18 MHz of spectrum (even less if the signals are digitized). Boeing Comments at 88. It is clear that provision of such signals is at most only a small part of Northpoint's business plan.

227/ See DirecTV Comments at 6, 28-29; USSB Comments at 3; EchoStar Comments at 13; Virgo Comments at 27.

228/ Public Notice, DA 99-452, rel. March 4, 1999.

circumvent the auction process, but rather should require Northpoint to bid, like all its other competitors, in an upcoming auction.[229/]

3. There is no Technical Reason Why Northpoint Should Operate in the 12.2-12.7 GHz Band.

According to its original proposal, the Northpoint service would essentially "piggy-back" off the existing DBS services. This was Northpoint's sole reason for requesting use of the 12.2-12.7 GHz band.

Northpoint now claims that, even if it does not package its services with DBS services, it will nonetheless enjoy commercial advantages over other competitors by using a band for which inexpensive off-the-shelf equipment already exists. In Northpoint's scheme, consumers will purchase a second DBS dish and other related equipment, which Northpoint would then reconfigure to receive its services.[230/]

First, without the cooperation of DBS licensees, Northpoint will have difficulties obtaining the encoding and transmission equipment needed to transmit signals that can be decoded by off-the-shelf receivers, even if modified by Northpoint. DirecTV, for example, uses a digital video compression technology that is proprietary and non-standard, and there is no assurance that Northpoint would be able to purchase

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229/ Boeing Comments at 88-89; EchoStar Comments at 14, n.20. Northpoint's distaste for the competitive arena extends to its proposed use of the 12.2-12.7 GHz band. Apparently, Northpoint will not be able to accommodate competitors in the 12.2.-12.7 GHz band, because its technology cannot share spectrum with other terrestrial systems. Northpoint Comments at 33.

230/ Northpoint Comments at 13-14. It should be pointed out that modifying a DBS receiver voids the warranty, and could pose a safety hazard.

compatible equipment.[231/] Similarly, the program guide and system information protocol used by DirecTV, which is an essential tool for consumers to navigate between channels, is different from the protocol that the U.S. broadcasters have adopted.[232/] Finally, the modulation and error correction employed by satellite carriers is optimized for satellite propagation characteristics and spacecraft power limitations, and is not likely to be optimal for terrestrial video distribution.[233/]

231/ While DirecTV uses the same general approaches as the MPEG-2 standard, it differs in certain details, particularly with respect to packet sizes. The MPEG-2 standard requires packets of 188 bytes, while the DirecTV system uses 132 byte packets. As a result, an off-the-shelf digital television receiver will not receive a DirecTV digital video signal. And an off-the-shelf digital television encoder that conforms to the MPEG-2 standard cannot produce a digital bitstream that can be received and decoded by a DirecTV receiver. Since the DirecTV method is proprietary, there is no assurance that Northpoint would be able to purchase appropriate encoders to transmit the analog NTSC programs that are broadcast today, and MPEG-2 digital programs sent by digital TV stations, for reception by DirecTV home decoders. While the EchoStar transmissions are MPEG-2 compliant, to supplement both BSS services, Northpoint would have to transmit each channel in two formats.

232/ Broadcasters employ a protocol known as Program and System Information Protocol ("PSIP") to carry ancillary data, such as electronic program guide data, closed captioning, parental control data, etc., standardized as Document A/65 by the Advanced Television Systems Committee. Again because of timing differences, DirecTV employs a different protocol. Here again, there is no assurance that Northpoint would be able to purchase the necessary equipment to code packets with the DirecTV protocol for insertion into the compressed form of analog NTSC television programs, or to recode PSIP packets that were broadcast with digital television programs.

233/ DirecTV employs QPSK modulation for its transmission. See DirecTV Comments, Technical Appendix B at 8. QPSK modulation is well suited for an environment where transmission power is a scarce resource. In contrast, terrestrial transmission of digital video signals generally employs modulation methods such as 8-VSB and 64-QAM, which are better suited to the terrestrial propagation environment. Moreover, the error correction methods used by terrestrial transmission systems and by satellite delivery systems employ different Reed-Solomon coding, different interleaving and different convolutional coding, because of the differing error and interference

(continued...)

Northpoint has provided no explanation whatsoever as to how it will overcome these difficulties.

Further, Northpoint complains that it cannot deploy its terrestrial wireless broadband service in the bands actually slated by the Commission for such services without incurring substantial costs and time delays associated with developing different equipment.[234/] This situation is no different from that faced by its competitors, but also is rather misleading.[235/] In fact, terrestrial wireless broadband services are currently being provided by competitors in various of the bands set aside for such services. Northpoint has made no showing whatsoever that it will experience any difficulty in obtaining equipment for its service operating in other bands.

Finally, as pointed out by DirecTV and Denali, even if Northpoint is somehow able to make use of the DBS receiver, Northpoint must provide not only an antenna pointed towards the nearest Northpoint transmitter, but also a separate low-noise block down converter ("LNB"). It cannot simply interconnect its antenna to the front end of the DBS LNB without significantly degrading the DBS reception.

233/ (...continued)
environment. See generally Modern Cable Television Technology, W. Ciciora, J. Farmer and D. Large, Morgan Kaufmann Publishers, 1999, at Section 3.6.

234/ Northpoint Comments at 15.

235/ For example, Northpoint claims that wireless cable providers "do not have equipment that is availably at attractive price points in consumer electronics retailers." Northpoint Comments at 16. This, of course, is a patently misleading statement. Wireless cable operators historically have not sought to market equipment at the retail level, á la DBS, choosing instead the catv (leased) model. There is, however, no reason to believe that 2.5 GHz equipment could not be made available in mass retail quantities at prices equal to or below current DBS equipment.

Therefore, since it must supply its own LNB anyway, Northpoint can downconvert from other frequencies (e.g., LMDS, MMDS, or DEMS frequencies) just as easily as it can downconvert from the 12.2-12.7 GHz band.[236/]

In short, there is simply no reason why Northpoint must use the 12.2-12.7 GHz band, and, as demonstrated below, myriad reasons why it should not.

B. The Northpoint Technology

Northpoint claims that through "sheer ingenuity and persistence," Northpoint was born.[237/] In fact, there is nothing novel about Northpoint's technology. As DirecTV pointed out, it is based on the same frequency re-use principles employed by numerous terrestrial microwave systems.[238/] Indeed, as noted by several commenters, the Northpoint system seems extraordinarily deficient from a technological standpoint, reflecting a lack of any real understanding of the satellite services with which it proposes to share, and making glaring errors in its analytical and experimental analyses.[239/]

As SkyBridge discussed in its comments, Northpoint's filings with the Commission have been completely devoid of the information required for any party (whether NGSO FSS or DBS) to conduct a definitive interference analysis. The comments in this proceeding demonstrate that other parties have had exactly the same

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236/ DirecTV Comments at 29; Denali Comments at 14.

237/ Northpoint Comments at 2.

238/ DirecTV Comments at 27-28.

239/ See e.g., DirecTV Comments at 25-26; EchoStar Comments, Annex on Northpoint's Austin Tests; USSB Comments at 5-12.

difficulty.[240/] The Northpoint system noise floor bears no relationship to the requirements of any viable FS system; the stated performance objectives have no demonstrable justification; and, as a consequence, there were no valid protection criteria available to be used in any sharing studies, particularly with regard to NGSO FSS downlinks. The very few technical parameters Northpoint is willing to reveal keep changing without explanation.

Moreover, the technical exhibits appended to Northpoint's comments only muddy the waters further. Table 1 of Exhibit 1 of Northpoint's comments, for example, shows wide ranges for key parameters, making it difficult to understand how the system actually would operate.[241/] Although some variation must be expected to take into account local conditions, the specifications provided by Northpoint do not reflect a mature system design. Furthermore, the maximum EIRP value specified (-7.5 dBW) is not consistent with the value (+15 dBW) provided in the Northpoint Applications. Despite Northpoint's claims to the contrary, many parameters (such as the ranges of channel bandwidth, transmit power, and antenna height) in Table 1 differ from those given in Northpoint's ITU-R contributions.[242/] Other parameters are totally inconsistent with each other (e.g., maximum transmit power of +6 dBW,

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240/ See, e.g., Denali Comments at 13.

241/ For example, channel bandwidth is specified as 1 kHz to 500 MHz; polarization is specified as horizontal or vertical or circular; transmit power is specified as -30 dBW to +6 dBW, EIRP is specified as -21.5 to -7.5 dBW; transmit height above average terrain is specified as 30 to 4500 meters; and transmit height above ground level is specified at 5 to 500 meters. Even the required carrier strength at the edge of the cell is given within a range of 5 dB. Northpoint Comments, Exhibit 1 at 2. It is therefore impossible to predict with any level of confidence that actual behavior of the system.

242/ Document 4-9-11/88; Document 4-9-11/125.

minimum antenna gain of 9 dBi, and maximum EIRP of -7.5 dBW). Finally, the specified noise floor is overly pessimistic for a terrestrial system. (Northpoint specifies a noise figure of 0 dB and a noise temperature of 284°K, which is almost at the Earth temperature.)

Furthermore, Northpoint fails to demonstrate that it can meet its claimed availability (99.7-99.995%, according to Table 1 of Northpoint's Technical Annex). First, Figure 6 of Northpoint's Technical Annex, showing rain margin as a function of the distance from the Northpoint transmitter for different rain zones, shows curious results. It indicates that, even in heavy rain regions (region N for example), an availability of 99.7% can be achieved 6 km from the transmitter with 0 dB of rain margin. This appears unrealistic. In any case, this figure shows that, even under the best conditions, Northpoint does not have enough margin over 50% of the U.S. territory using the "typical" parameters of the system. To properly analyze the impact of the Northpoint system, data showing how it meets its performance objectives in other than "typical" cases is needed. In addition, these calculations appear to be made without considering any provision for intra-system interference from e.g., multipath from buildings and interference from the required overlapping cells (as discussed below, Northpoint claims to have up to three Northpoint transmitters visible to a given receiver).

Numerous parties echoed SkyBridge's concern that Northpoint has not adequately examined the multipath issue, which is specific to each Northpoint site.[243/] The first test (at King Ranch) did not test for multipath interference, and the second

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243/ EchoStar Comments at 10; Virgo Comments at 26.

test did not gather sufficient data to draw conclusions.[244] Moreover, Figure 7 of Northpoint's Technical Annex, which attempts to show the probability of fading on the Northpoint path, has been derived using equations 1 and 2 of Recommendation ITU-R 530-7. However, these equations are applicable only for determining the percentage of time a fade depth greater than 25 or 35 dB is exceeded. Northpoint has used these equations for determining the percentage of time a 2.6 dB fade depth is exceeded.[245] Calculations show that the percentage of time a fade greater than 2.6 dB occurs on a 16 km link for $p_L=15$ and $C_o=8$ is 18%, a result quite different from that claimed by Northpoint. In addition, Northpoint ignores the fact that multipath affects quality rather than availability.[246] Finally, despite Northpoint's claims to the contrary, low gain antennas are more affected by multipath fading than high gain antennas. Because of their lower rejection in the sidelobes, the C/I is lower (I being the multipath interference), making these antennas more sensitive to multipath fading.

In addition, several parties have pointed out that Northpoint's tests did not adequately study the feasibility of the power control system Northpoint proposes as necessary to protect DBS transmissions during rain fade conditions.[247] Northpoint's proposed monitoring stations will not take into account the fact that different paths and different fade mechanisms exist on satellite paths compared to terrestrial paths. Fading of DBS signals at DBS receivers deployed throughout the

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244/ USSB Comments at 6, 11.

245/ See Section 2.3.2 of Recommendation ITU-R 530-7.

246/ See Northpoint Comments, Exhibit 1 at 7-9.

247/ USSB Comments at 7, HBO Comments at 10.

Northpoint coverage area would not be sufficiently correlated with fading at Northpoint's contemplated monitoring site.[248] Moreover, the nature of the rain is important, as is elevation angle. The elevation angles used in both Northpoint tests are flatly unrepresentative of those employed in the vast majority of the country, because the elevation angles at the Texas test sites are significantly higher than in the rest of the US.[249] Finally, as one party explained,[250] use of power control to cope with DBS signal fading is problematic, because keeping the DBS C/(N+I) above threshold requires reductions in interfering signal power even greater than the amount of the DBS fade, which would be debilitating to the interfering system. In heavy rain, the sky noise part of N also increases; thus the interference needs to be further lowered.

C. Sharing Between NGSO FSS and the Northpoint Service

Northpoint states that "[t]errestrial and NGSO FSS systems can, and in fact do, share spectrum without causing harmful interference to each other."[251] SkyBridge agrees. SkyBridge has designed a system that will be able to readily share with the FS deployment and expansion authorized in the bands in which it has proposed to operate. Northpoint's high density, point-to-multipoint system is an

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248/ STA Comments at 10, n.17.

249/ USSB Comments at 7-8. Given the highly questionable nature of the rest of Northpoint's data, one must wonder why Texas, a location that all but guarantees skewed results, was selected as a test site.

250/ STA Comments at 10, n.17.

251/ Northpoint Comments at 25.

entirely different matter, however.[252/] As SkyBridge highlighted in its comments, the Commission has detailed the problems inherent in sharing between such systems and ubiquitous satellite earth stations in multiple proceedings.[253/]

While Northpoint proposes to operate on a secondary status with respect to BSS operations in the band, Northpoint urges that its service should be deemed co-primary with respect to NGSO FSS.[254/] Northpoint provides no justification for this discrepancy, as there is none. This band has long been cleared of terrestrial systems in order to foster ubiquitous satellite services in the band. NGSO FSS has been allocated internationally on a co-primary basis with BSS in this band upon a definitive showing that the two services can co-exist. No DBS provider disputes that sharing amongst these satellite services is possible. On the other hand, it has been well-demonstrated in this proceeding that Northpoint cannot co-exist with either DBS or NGSO FSS systems. If, despite all of the demonstrations of harm by the DBS and NGSO FSS operators, the Commission nonetheless authorizes a Northpoint-type

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252/ In response to SkyBridge's showings of the harm that would be caused to satellite systems by the Northpoint proposal, Northpoint disingenuously accuses SkyBridge of departing from its assurances regarding its ability to protect, and impose no operational constrains on, terrestrial operations. Northpoint Comments at 9-10, 30. The only terrestrial operations in these bands are point-to-point, and, as demonstrated in its comments, SkyBridge has taken unprecedented steps to protect these authorized services. Northpoint's eleventh-hour effort to introduce a high-density, point-to-multipoint service in a band that has been long cleared of most terrestrial operations is well beyond the scope of any of SkyBridge's representations. Moreover, there is no evidence that NGSO FSS will interfere with Northpoint. It is Northpoint that will harm NGSO FSS systems.

253/ See SkyBridge Comments at 115.

254/ Northpoint Comments at 26. Although NGSO FSS was allocated internationally on a co-primary basis at the time Northpoint filed its Petition, Northpoint did not make this claim in its Petition.

service in the 12.2-12.7 GHz band, this authorization must be on a secondary basis to both the co-primary BSS and NGSO FSS services.

1. NGSO FSS Systems Should Not Cause Interference to Northpoint Subscriber Antennas.

In its comments, Northpoint continues to claim that its technology requires more protection than the WRC-97 PFD limits provide.[255/] As SkyBridge pointed out in its comments, however, Northpoint has never offered a shred of justification for its rather extraordinary protection criteria. Northpoint's proposed criteria seem to be derived from the wildly optimistic and unjustified performance/availability objectives it is claiming with its low fade margin. There is no valid reason for Northpoint to claim a more stringent protection criteria than point-to-point FS operators, which have accepted the WRC-97 PFD limits. If Northpoint is accorded a technically rational level of protection, the PFD limits recently approved by the JTG would fully protect the Northpoint system.

Northpoint goes on to argue that its transmitters and NGSO FSS systems can coexist "if certain modest modifications are made to the NGSO FSS proposals."[256/] Specifically, Northpoint claims that coordination between Northpoint

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255/ Northpoint Comments at 31. Northpoint urges the Commission to consider that some of the NGSO FSS Ku-band systems on file at the Commission would meet Northpoint's claimed protection criteria. However, this statement is based on NGSO FSS PFD levels assumed by Northpoint, and not provided or confirmed by the NGSO FSS operators. Id. More importantly, as discussed above, see Section III.B, this is not an appropriate consideration. The Commission should look at the services each system can provide and consideration of NGSO/NGSO sharing to ensure optimum use of the spectrum for the public interest.

256/ Northpoint Comments at 26.

and the NGSO systems will ensure compatibility.[257] Northpoint's proposal really is not a coordination at all, however. Rather, Northpoint proposes that its services be over protected by requiring NGSO FSS systems to avoid use of certain frequencies or shut off certain beams in Northpoint service areas. Northpoint would have no obligation whatsoever to share in the burden.

Moreover, Northpoint makes the astonishing claim that the implementation of its proposed mitigation technique to protect Northpoint would not have any impact on NGSO FSS systems.[258] Every time that constraints are imposed on an NGSO FSS system's use of frequencies or beams, it affects the systems capacity and ability to provide service to all regions. NGSO systems already pay a substantial penalty to avoid the GSO arc and to accommodate existing FS facilities. Northpoint's proposal that NGSO FSS systems take further steps to protect its fictitious "terrestrial" arc would require system redesigns, including, most significantly, increases in the number of satellites to increase the minimum elevation angle of the satellite and still offer global service.

In any case, as with other terrestrial systems, Northpoint should be fully protected by the PFD limits. If, despite the clear evidence of interference to satellite systems, the Commission decides to license Northpoint-type systems, the Commission

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257/ Northpoint Comments at 27. Northpoint claims that NGSO systems have the ability to mitigate interference to Northpoint's system in a number of ways, most notably through terrestrial arc avoidance. Northpoint states that NGSO operators could use "Alternate Beam Assignment" to assign those customers within the coordination area frequencies outside the 12.2-12.7 GHz range. Northpoint Comments at 27-29, Exhibit 1.

258/ Northpoint Comments at 29-30.

should refrain from imposing any requirements other than the PFD limits on NGSO FSS systems.

2. Northpoint Will Cause Harmful Interference to NGSO FSS Subscriber Earth Stations.

Numerous commenters agree with SkyBridge that NGSO FSS systems will suffer significant interference from a Northpoint system.[259/] Sharing among ubiquitous satellite earth stations and high density point-to-multipoint terrestrial systems presents an intractable problem; the Commission has detailed the problems inherent in such proposals in multiple proceedings.

It is undisputed that each Northpoint transmitter will create a region in which NGSO FSS user terminals cannot operate. As described by Boeing, an NGSO FSS operator: (1) would be unable to provide services to any consumers within the vicinity of a Northpoint transmitter; (2) would be unable to sell user terminals to any customer without initially conducting a survey of the customer's premises; and (3) could be subject to loss of an existing customer every time Northpoint expands into a new community and erects its numerous transmitters. This will place NGSO FSS operations at a significant disadvantage with respect to other providers of satellite broadband services.[260/]

259/ See Boeing Comments at 87; Virgo Comments at iv, 27; Denali Comments at 15; STA Comments at 10.

260/ Boeing Comments at 87-88. The situation is similar for DBS operators. Northpoint claims that in the "mitigation zones" surrounding each of its transmitters, it could employ a variety of "proven engineering techniques" to protect DBS receive antennas. In Northpoint's view, these include repositioning poorly pointed DBS antennas, replacing the standard DBS antenna, relocating DBS subscriber dishes, and installing shielding.

(continued...)

Moreover, based on information in Northpoint's comments, the size and number of the NGSO user terminal exclusion zones would be quite large. First, Northpoint has applied to provide service in all 212 television markets.[261/] Thus, it must be assumed that there will be NGSO user terminal exclusion zones in all populated areas.

Furthermore, multiple transmitters would be needed to ensure reasonable coverage of even a small television market. Northpoint claims that it can site transmitters in areas where the population density is far lower than the average throughout the service area.[262/] As SkyBridge has noted from the start, however, it is absolutely clear that many will necessarily be sited in the middle of populated areas.[263/] As Northpoint now confirms, its service will use a series of cascading cells, each with a transmitter serving a 10-16 mile service region.[264/] Making matters worse, Northpoint claims it will have multiple line-of-sight paths from any subscriber to at least three Northpoint transmitters.[265/] This use of overlapping cells will greatly

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260/ (...continued)
Northpoint Comments at 18-19. However, DBS (and NGSO FSS) is a consumer-friendly service, and as pointed out by DBS licensees, Northpoint's proposed solutions are neither economically nor aesthetically acceptable. DirecTV Comments at 24; EchoStar Comments at 10; USSB Comments at 10-11.

261/ Northpoint Comments at 11.

262/ Northpoint Comments at 22.

263/ See Opposition of SkyBridge, RM No. 9245, filed April 20, 1998 ("SkyBridge Opposition to Northpoint Petition") at 6.

264/ Northpoint Comments at 4.

265/ Northpoint Comments at 5. This also means that multiple sets of shields (e.g., the pie plates used in the Austin tests) will be needed by DBS customers, and (continued...)

increase Northpoint interference into NGSO (and BSS) receivers. The aggregate impact of the powers generated by these transmitters must be taken into account.[266/]

When all of these factors are considered, it becomes clear that the impact of Northpoint's proposed high-density service on NGSO user terminal deployment would be devastating. The ability of these global systems to serve the United States would be thwarted. Such a result is commercially untenable for the NGSO operator, and flies in the face of Congress's mandate in Section 706 of the '96 Act.

D. Sharing Between DBS and the Northpoint Service

Northpoint continues to make light of the concerns of DBS providers regarding the grievous interference that would be caused by Northpoint.[267/] Furthermore, Northpoint urges DBS operators to rely on its obligation, by virtue of its secondary status, to solve any problems.[268/] However, as pointed out by DirecTV, Northpoint plans to be a full competitor to DBS, and will have every incentive to

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265/ (...continued)
each installation will have to be customized on the roof.

266/ See STA Comments at 10.

267/ Northpoint disingenuously asserts, for example, that "[w]hile some DBS providers acknowledged that Northpoint's Rulemaking Petition was based on a worthy goal of solving their local signal problem, other providers unexpectedly challenged the idea that Northpoint could coexist with DBS without causing interference." Northpoint Comments at 8. In fact, all DBS providers have challenged Northpoint's non-interference claims, and have done so for quite some time, based on Northpoint's patently inadequate technical showings. This reaction could hardly have been "unexpected."

268/ Northpoint Comments at 23.

dispute claims of harmful interference.[269/] As many of the interference issues are similar for the ubiquitous user terminals of both NGSO FSS and DBS services, SkyBridge will address Northpoint's inadequate response to these concerns.

1. **Interference to DBS Receivers.**

First, as in the case of NGSO systems described above, the exclusion zones (Northpoint prefers the euphemism "mitigation zones") for DBS receive dish deployment caused by Northpoint will be large and numerous in all markets. DirecTV computes that the zone around each Northpoint transmitter where the interference would be unacceptable for BSS operations would occupy more than 50% of the Northpoint service area for a single transmitter.

Moreover, the overlapping coverages of the three Northpoint transmitters that can be seen by a single Northpoint receiver will increase the size of the exclusion zones.[270/] Northpoint postulates that use of higher antennas may reduce the size of exclusion zones, but, as USSB points out, that may be difficult or impossible due to zoning restrictions.[271/] Even if Northpoint is able to take advantage of terrain features (such as rivers, as in the case of the Austin test) or tower height to lessen the impact of its exclusion zones in some cases, it must be recognized that, in

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269/ DirecTV Comments at 6, 30.

270/ DirecTV at 5, 24. Other commenters agreed with DirecTV's observation that Northpoint severely underestimates the extent of these exclusion zones. For example, one party pointed out that Northpoint failed to address the aggregate interference from its fully deployed terrestrial system, and erroneously assuming that a C/(N+I) ratio corresponding with freeze frame can be used to define the exclusion areas. STA Comments at 10.

271/ USSB Comments at 10.

the general case, the exclusion zone will create a demonstrable impediment to provision of DBS (and NGSO FSS) service.

As pointed out by DirecTV, Northpoint's own tests showed interference levels higher than will be allowed for NGSO FSS systems.[272/] Given the huge amount of detailed work that has gone into the JTG and other ITU-R studies, substantial deference should be given to results of those studies. Agreement has been reached in these working groups on the protection criteria for BSS systems, and the methodologies to assess interference; even though a Northpoint representative was in attendance in at least some of these meetings, these results are completely ignored by Northpoint.

2. Northpoint's Experimental Tests.

Northpoint continues to insist that its technology has been proven by extensive field testing.[273/] However, as pointed out by DBS licensees, Northpoint makes numerous assertions in its experimental reports that are clearly erroneous and that demonstrate a complete lack of understanding of the complex technical issues involved.[274/] Northpoint's inability to properly conduct sharing studies between its terrestrial system and satellite systems is also obviously of grave concern to NGSO FSS applicants.

The Northpoint Austin Test Report, Exhibit 6 of its comments, shows that the most fundamental tenets of radio propagation testing were violated.

272/ DirecTV Comments at 5, 24-25.

273/ Northpoint Comments at i.

274/ DirecTV Comments at 5.

Moreover, many of the errors made by Northpoint in its recent Austin tests were pointed out nearly a year ago by SkyBridge in its comments on the Northpoint Petition. DirecTV observed the tests first-hand,[275/] but was apparently unable to persuade Northpoint to use reasonable experimental techniques. Among the more patent defects are the following:

* There is no evidence that the test equipment and instrumentation was properly calibrated, and there are significant indications that it was not.[276/]

  - For example, Exhibit 6 appears to suggest that the transmitter was operated without calibration for the first twelve days. (This would arguably be a violation of Section 5.151(a)(2)). On December 18, three days after the transmitter was calibrated, the test report indicates there were test equipment problems, but it appears there was never a re-calibration of the transmitter to verify there were no changes in power, frequency stability, or EIRP.

  - The transmitting antenna pattern appears to never have been calibrated. The transmit building blocked part of the service area (Exhibit 6, page 13), which undoubtedly introduced multipath signals that created peaks in some directions and nulls in other directions.

  - The receive antenna pattern appears to never have been calibrated. Moreover, considering the manual handling of the antenna at each test site at the end of a boom, changes in the antenna pattern may have occurred during the testing.

  - The bit error rate was never calibrated. In fact, only "S-meter" readings rather than actual bit error rates were recorded. It appears that no attempt was made to calibrate the RCA DirecTV or EchoStar "S-meters."[277/] Moreover, an attempt to correlate the signal strength pointer to the levels documented in Northpoint's spectrum analyzer plots shows a wide scatter, thus rendering any claim of calibration questionable.

275/ Id. at 25.

276/ See also EchoStar Comments at 11; USSB Comments at 7.

277/ See also USSB Comments at 7.

- Moreover, the received signal connection was shared between the Tanberg (Northpoint) receiver, the RCA/DirecTV receiver and the EchoStar receiver by means of manually disconnecting and reconnecting a cable. At least 100 connect/disconnect cycles were needed. If the connections are not tight, the losses can vary from one connection to the next. In fact, the S-meter readings demonstrate an inability to record consistent data.

✳ There are inconsistencies in data recording the location and time of measurements.

- For example, depending upon which site maps are used, the altitude of Site 2 varies from 580 to 696 to 792 feet. The latitude of Site 4 varies by about 370 meters from one measurement to another. For Site 27, the latitude varies by about 1480 meters and the altitude by 620 feet.

- According to the Test Report in Exhibit 6, on December 22 testing was done at Site 8 from 12:15 to 12:40 and at Site 9 from 12:39 to 13:30. Either the test equipment was in two places at once, or the data contains errors.

- On December 28, the transmitter log shows the transmitter was off the air between 16:44 and 16:48, but plot 15-N shows a signal at 16:46:58.

✳ The test sites were not typical DBS receive sites.

- The receiver test sites were largely located along curbs of streets. Because streets are generally more clear of obstacles than normal residential DBS installations, the incidence of multipath signals was not properly tested. Moreover, at some of the test sites the DirecTV or EchoStar signal was blocked by trees or other obstacles, suggesting that these would not be typical DBS receive sites. Similarly, there were large variations (up to 10 dB) in received DBS signal levels between sites, which would not be expected in unobstructed BSS receive locations (Field Data Summary, Table IV-4). Moreover, some of the test measurements were made with the receiver in an elevated boom, with apparently little physical control over the pointing direction of the receive antenna.

- There were no test sites closer than one-third mile from the transmitter. The transmitter was mounted on a building next to a river, with only industrial sites and parking lots nearby across the river. Thus, there were no residential areas with DBS receivers close to the Northpoint transmitter.

* The signal that was transmitted had a bandwidth that was not typical of digital video signals that Northpoint would use in practice.

  - While BSS systems employ transmission bandwidths of 24 MHz, and Northpoint claims that it intends to use off-the-shelf BSS equipment for transmitting its signal, in these tests it used an 8 MHz bandwidth signal. Moreover, by using a resolution bandwidth of 1.0 MHz in the test equipment rather than the Channel Power setting of the HP8591E, the instrumentation may have been set up improperly.

* Northpoint did not test satellites at lower elevation angles (such as EchoStar's at 61.5° W.L. and 148° W.L.), which are likely to be more sensitive to interference.[278/]

* Northpoint measured only one channel per satellite per location, assuming each video channel will be equally affected. This assumption is wrong.[279/]

* Northpoint appears to be selective in the data it chooses to record and present. Much of the transmitter time appears to be unaccounted for. DirecTV noted in its comments that it witnessed severe interference, including total loss of picture, on several occasions.[280/] However, this data does not appear in Northpoint's report.

In sum, as described by DirecTV in its Comments,[281/] Northpoint: (1) collected insufficient data to warrant extrapolation of its experimental results; (2) used multiple uncontrolled variables and unrepeatable data collection techniques that render the data highly questionable; (3) used bandwidth test signals and other inputs that did not replicate either real-world or worst-case interference scenarios; and

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278/ EchoStar Comments at 9. See also SkyBridge Opposition to Northpoint Petition at 16.

279/ EchoStar Comments at 10. See also SkyBridge Opposition to Northpoint Petition at 17.

280/ DirecTV Comments, Northpoint Annex at 20-21.

281/ DirecTV Comments at 25-26.

(4) demonstrated virtually a complete lack of technical understanding of video compression and BSS signal transmission.

E. There is No Basis for Licensing Northpoint-type Systems at Ku-band.

As SkyBridge explained in its comments, SkyBridge is sympathetic to the dilemma currently confronted by DBS consumers regarding reception of local broadcast signals. However, as discussed above, there are far better means for providing local service than the Northpoint system.

Moreover, Northpoint has failed to provide any justification for using the 12.2-12.7 GHz band. It appears to be using the politically convenient promise of providing local channel service to avoid the Commission's licensing requirements in the bands actually allocated for its proposed terrestrial broadband wireless services. Most importantly, Northpoint appears to be attempting to gain free access to spectrum that its competitors have had to pay for at auction.

Reintroducing terrestrial use into the band would run counter to the Commission's prior efforts to promote DBS, and its current efforts to introduce global broadband interactive services.[282/] NGSO FSS proponents have demonstrated to the satisfaction of the DBS industry that, with adequate technical limits, NGSO FSS and DBS systems can successfully share spectrum. Northpoint has failed to make such a showing, and the waivers must be denied.

282/ DirecTV Comments at 29; SBCA Comments at 2-3.

CONCLUSION

The comments in this proceeding demonstrate that the Commission can expedite the attainment of the U.S.'s longstanding goal of universally available global information infrastructure, while preserving existing GSO and FS Ku-band services and ensuring their continued opportunity for growth. As the JTG continues to examine the technical issues presented, consensus is being reached on more and more points, and existing GSO and FS operators are gaining confidence that their legitimate interests will not be threatened by the introduction of Ku-band NGSO FSS systems. The Commission should lend all of its support and encouragement as this process moves toward completion.

In the meantime, the Commission should proceed to adopt the regulatory regime described above at the earliest opportunity. While the final determination regarding certain technical issues should not be made until the ITU process has been concluded, it can be said with confidence at this juncture that the

process will conclude successfully, and that NGSO FSS systems will operate at Ku-band in the near future. The Commission should use this proceeding to further the realization of that goal.

Respectfully submitted,

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